

SURVEY ON ANTIBIOTIC USE IN PIG AND CHICKEN PRODUCTION IN RED RIVER DELTA OF VIETNAM

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Abstract—the abuse and illegal use of veterinary drug in animal production is one of the main causes of the presence of antibiotic residues in meat. This is difficult to control, particularly in developing countries like Vietnam. However, this is a recent issue and has not yet been thoroughly investigated. The aim of this study was to provide information on the use of antibiotics in different animal production systems in the Red River Delta of Vietnam. The survey was conducted from July 2009 to March 2010 on 270 animal production entities representing three different systems of animal production (farm household, semi- industrial and industrial) in three different provinces. The result showed that a large number of antibiotic are used largely and arbitrary in all animal production systems. The purpose of this use is not only to treat diseases, but also for disease prevention, and, in some cases, for growth promotion. At least 50 antibiotics of more than 10 different groups were used in pig and chicken production in the Red River Delta of Vietnam. Fifteen antimicrobial growth promoters were shown to be used as pig and chicken feed additives. For treatment of diseases and disease prevention, antibiotics were used abusively and even illegally (e.g. chloramphenicol) by both farmers and local veterinarians. The level of knowledge of the farmer about food safety appeared very low, while the management of the traceability and the network of veterinary drugs distribution are still limited.

Index Terms— Antibiotics, Animal production, Veterinary drugs, Red River Delta, Vietnam.

I. INTRODUCTION

In Vietnam, a country with over 85 million persons and a very high population density, especially in the Red River Delta, the demands of foodstuff from animal origin for domestic markets is increasing, together with urbanization and industrialization, leading to agricultural areas becoming narrower and narrower. The increasing development of intensive livestock husbandry models is an indispensable trend in the Vietnamese context. However, because of the low level of hygiene in livestock husbandry, the inadequacy of husbandry zone planning and the lack of state management and development strategies, it results in some new problems such as environment pollution, frequently occurring and uncontrolled epidemic diseases (Animal Husbandry Department, 2008; Ly, 2007, 2009).

Facing this situation, producers consider antibiotics, used for disease prevention and therapeutic purposes, as one of the solutions to fight against livestock diseases. Based on this demand, veterinary medicaments are widely produced, imported and sold in markets. However, the animal raisers' knowledge is still very restricted while the state inspection and management haven't met practical demands yet (Thuy, 2009). The use of antibiotics in animal production by farmers in a casual, unmethodical manner, without any veterinary prescription and supervision lead to the presence of residues in animal products. This issue causes bad impacts on public health and bad influences on environment and animal therapeutic sciences. It could also contribute to the development of antibiotic-resistant in human pathogens via the food supply (UCS, 2001; Molback, 2004; Wang, Manuzon, Lehman, Wan, Luo, Wittum, Youssef, Bakaletz, 2006).

The aim of this study was to provide information on the use of antibiotics in different animal production systems in the Red River Delta of Vietnam.

II. MATERIALS AND METHODS

A cross-sectional study of antibiotic use in pig and chicken production as well as farmer's knowledge about food safety related to the use of veterinary drugs in the region of the Red River Delta was designed and conducted from July 2009 to March 2010 on 270 entities representing 3 different systems of livestock husbandry: farm household, semi-industrial and industrial, in 3 representative localities of the Red River Delta (Hai-Duong, Thai-Binh and Ha-Noi) (Table 1).

Questionnaires, contents of which were compiled after test survey and adjustment, were used for direct interviews of owners, technical cadres or veterinary doctors of the farm. The informations of veterinary drugs, antibiotic components and active elements which weren't noted in the farm were tracked down and collected through labels on remedy packs or jars left around animal housing or at local veterinary medicine pharmacy.

In order to ensure the objectivity of full remedy use information exploitation, all householders' names and addresses were kept in security through encoding addresses just at the survey time.

Table 1. Survey sample size and localities

Localities		Ha Noi	Hai Duong	Thai Binh	Total (by production system)
System of animal production					
Industrial	<i>Pig</i>	10	10	10	30
	<i>Chicken</i>	10	10	10	30
Semi-industrial	<i>Pig</i>	10	10	10	30
	<i>Chicken</i>	10	10	10	30
Farm household	<i>Pig, chicken</i>	50	50	50	150
Total (by localities)		90	90	90	270

III. RESULTS AND DISCUSSION

Identification of antibiotics used in pig and chicken production in different provinces of the Red River Delta

At least 50 antibiotics of more than 10 groups appeared to be used in pig and chicken production in studied localities, for growth promotion, disease prevention or therapeutic purpose.

For growth promotion, meanwhile antibiotic use as growth promoters in animal feeds has been prohibited in Europe since January 1st 2006, in Vietnam, this is still permitted. According to feed Standards (TCN 861:2006) promulgated by the Decision N^o 4099-QD/BNN-KHCN dated 29 December 2006 of the Ministry of Agriculture and Rural Development (MARD), a number of antibiotics and chemicals are permitted to be mixed in industrial feed for chicken and pig (24 different antimicrobials for chicken, 14 for pig).

Survey results showed that 10 and 11 different antibiotics are used for growth promotion in chicken and pig production, respectively (Table 2), from which 4 (Ampicilin, Colistin, Duclazuril and Tetracyclin) and 6 (Amoxycillin, Tiamulin, Monensin, Salinomycin, Colistin and Tetracyclin) antimicrobials respectively are not allowed by the vietnamese legislation. We can observe that in spite of their absence on the list of permitted antibiotics for growth promotion, some antibiotics are popularly used yet, especially Colistin in pig feed, found in 78 pig farms.

For disease prevention purpose, 33 and 24 different antibiotics were found to be used in chicken and pig production, respectively, while The number of different antibiotics used for pig and chicken curative purpose were 37 and 31 respectively (Table 2).

These data show that in pig production, Aminoglycosides, Tetracyclines, Phenicol, Beta-Lactames and Fluoroquinolones groups are the most commonly used for disease prevention and treatment, mainly for pig therapy, while Sulfamides, Beta-Lactames, Tetracyclines, Aminoglycosides, Ionophores and Colistin groups are commonly used for chicken disease prevention and therapy, but mainly for disease prevention.

Veterinary activities and issues related to food safety in the use of antibiotics

Few animal raising householders are trained on veterinary practices, however, they are themselves in charge of most veterinary activities such as vaccination, animal prophylaxy and treatment. Especially for the industrial and semi-industrial production, veterinary activities and therapy are mainly assumed by the owners (95% of them for semi-industrial farm and 100% for industrial farm), while, for farm households, about 60% of them undertake themselves the therapy of their animals and nearly 40% need the assistance of local veterinarians (Table 3).

The antibiotics were mainly chosen on the base of advice from representatives of pharmaceutical companies or local druggsellers after some symptoms told by animal owner and their experiences (35.2% and 15.9% respectively) (Table 3). Very few samples of ill animals are sent to laboratories for diagnosis before therapy. Therefore, it shows that the therapy is mainly based on judgment through symptoms by experience of druggsellers and farmer. This shows that the use of antibiotic in animal production by farmers without any veterinary prescription and supervision are common in this region.

The rate of farmers who note and circulate husbandry informations in the 3 production systems is only 13.7%, mainly those of industrial husbandry (Table 3). But the purpose of taking notes is mainly for economic accounting; very few households take notes for food safety and traceability purpose.

About 52% of surveyed entities were interested in stopping antibiotic use and respect the withdrawal time before slaughter. However, their main reason is reducing the husbandry costs and prices. Only 44% of them took in

consideration the restriction of antibiotic residue in animal products, aiming at protecting consumers (Table 3). As the state management of food safety hasn't really met practical demands yet, the pressure on animal purchasers is still very low. Less than 10% of farmers were interested in stopping antibiotic use and respecting the withdrawal time before slaughter under the pressure or requirement from animal consumers. Just in large-scale livestock husbandry (industrial and semi-industrial), farm holders are more interested in this issue than livestock raising households.

For the sick animal with bad prognosis, the farmers, even in big farms usually think of selling quickly in order to recover their funds (37.8%). Measures of destroying sick animals, ensuring proper technique, avoiding the spread of diseases and protecting consumers are little taken in consideration (18.9%) (Table 3). These kind of practices result in the presence of antibiotic residues in food.

IV. CONCLUSION

The antibiotic overuse and illegal use in pig and chicken production in region of the Red River Delta is very much worrying. There are at least 50 antibiotics used in pig and chicken production, from which some are allowed but a lot are prohibited antibiotics (e.g. feed additives).

Livestock raisers have very low awareness of the reasonableness and safety of antibiotic use as well as the food safety. Their use of antibiotics is very unmethodical and unscientific, mainly based on their experiences of on advices from veterinary drugsellers after describing symptoms.

Livestock in disease and therapy can be sold quickly in order to save funds or slaughter and use for food or feed of other animals. It creates difficulties for prophylaxis of epidemic diseases and unsafety for consumers.

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Table 2. Antibiotic used in pig and chicken production in the Red River Delta

Group	Antibiotic	Use frequency (number of entities)					
		Growth promoter		Disease prevention		Curative	
		Chicken	Pig	Chicken	Pig	Chicken	Pig
Aminoglycosides	Bycomycin	-	-	5	-	5	1
	Gentamycin	-	-	5	3	12	78
	Kanamycin	-	-	-	-	1	13
	Neomycin	-	-	5	3	2	3
	Spectinomycin	-	-	2	5	-	33
	Streptomycin	-	-	3	3	3	17
Beta lactams	Amoxycillin	-	6	8	7	9	18
	Ampicillin	1	-	31	2	13	18
	Cefotaxime	-	-	-	1	-	1
	Cephalectine	-	-	-	-	1	-
	Cepharadine	-	-	-	-	-	1
	Penicillin	-	-	2	1	1	14
Fluroquinolones	Danofloxacin	-	-	-	-	-	2
	Enrofloxacin	-	-	14	10	5	62
	Flumequine	-	-	-	-	-	1
	Flumicin	-	-	-	-	-	1
	Norfloxacin	-	-	6	17	5	16
	Erythromycin	-	-	1	-	-	-
Macrolides	Josanylin	-	-	1	-	-	-
	Kitasamycin	-	-	-	1	-	-
	Spiramycin	-	-	5	1	2	5
	Tiamulin	-	1	2	-	1	12
	Tylosin	-	7	15	8	20	94
	Sulfachlorpyrazin	-	-	21	2	11	1
Sulfamides	Sulfachlorzin	-	-	2	-	1	-
	Sulfadimidin	-	-	2	-	1	1
	Sulfamethoxazole	-	-	4	1	6	2
	Sulfaquinoxalin	-	-	2	-	5	-
	Sulfagualidin	-	-	9	1	8	2
	Oxymykoin	-	-	3	-	4	1
Tetracyclines	Chlortetracyclin	29	72	1	1	1	1
	Doxycylin	-	-	11	1	5	12
	Oxytetracyclin	-	1	10	11	4	30
	Tetracyclin	5	1	11	5	7	4
Phenicol	Chloramphenicol	-	-	2	-	3	6
	Flophenicol	-	-	-	5	-	17
	Thiamphenicol	-	-	1	1	3	21
Corticosteroids	Dexamethasone	-	-	-	-	-	12
	Predmisolone	-	-	-	-	-	11
Ionophores	Maduramycin	3	-	-	-	-	-
	Monensin	6	5	-	-	-	-
	Salinomycin	38	13	-	-	-	-
Others	Bambermycin	4	-	-	-	-	-
	Lincomycin	-	3	2	9	1	24
	BMD*	4	20	-	-	-	-
	Colistin	6	78	44	12	22	56
	Diclazuril	9	-	-	-	-	-
	Toltrazuril	-	-	6	-	-	2
	Diaverindin	-	-	9	-	4	-
	Trimethoprim	-	-	16	4	16	6
Number of different antibiotics used		10	11	33	24	31	37

*: Bacitracin Methylene-Disalicylate

-: not used

Table3. Veterinary activities and issues related to food safety in the use of antibiotics in three different systems of animal production in the Red River Delta (in %)

Criteria of assessment			Farm household (n=150)	Semi-industrial (n=60)	Industrial (n=60)	Median of $\Sigma n=270$
Veterinary activities	Veterinary activities	Owner	59.3	95.0	100.0	76.3
		Local veterinarian	39.3	5.0	0	23.0
		Both of them	1.3	0	0	0.7
	Base of choosing drugs	Experiences	7.3	13.3	40.0	15.9
		Drugseller	33.3	38.3	36.7	35.2
		After sending samples	0.7	6.7	13.3	4.8
		Local veterinarian	39.3	5.0	0	23.0
		Others (friends, marketing, books and newspapers...)	20.7	36.7	10.0	21.9
Monitoring information about livestock husbandry	Number of households taking notes, in which:		4.0	8.3	43.3	13.7
	Purpose of taking notes	Accounting	66.7	60.0	80.8	75.7
		Watching on health	33.3	0.0	19.2	18.9
		Both of them	0	20.0	0	2.7
		Others(Managing the number of heads.)	0	20.0	0	2.7
Use of veterinary drugs in compliance with sanitary legislation	Percentage of households respect the Withdrawal time, in which:		41.3	58.3	73.3	52.2
	Motivation of respect	Required by purchasers	8.1	8.6	4.5	7.1
		Protecting consumers	37.1	37.1	56.8	43.3
		Others (economic, weight gain)	54.8	54.3	38.6	49.6
	Percentage of households approached		72.7	86.7	81.7	77.8
	Approaching safety information sources	Technical cadres	2.8	1.9	0	1.9
		Medias (TV, Radio, ...)	85.3	61.5	73.5	76.7
		Friends & colleagues	0.9	1.9	2.0	1.4
		Seller of drugs	5.5	0	2.0	3.3
		Others (indication on Product labels.)	5.5	35	22.4	16.7
	What is done with ill livestock with bad prognosis	Changing remedies	21.3	31.7	20.0	23.3
		Selling quickly	44.7	18.3	40.0	37.8
		Slaughtering and consuming in family	8.0	10.0	6.7	8.1
		Destroying	16.0	26.7	18.3	18.9
		Feeding other animals	4.0	6.7	11.7	6.3
		Others(...)	6.0	6.7	3.3	5.6